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THE FAUNA OF THE SUNCHAL (OR MARGAS VERDES) FORMATION, NORTHERN ARGENTINA

BY T. D. A. COCKERELL

Fossil insects were discovered near Sunchal in the Province of Jujuy, Argentina, by Mr. Geo. L. Harrington. The specimens were transmitted to the U. S. National Museum and were described in Proc. U. S. National Museum, LXVIII, Art. 1 (1925). In 1925 my wife and I visited the locality and got a much larger collection; the particulars will be found in Natural History, XXVII (1927), pp. 80–84; Nature, Nov. 14 (1925), pp. 711–712; Entomological News, XXXVII (1926), pp. 134–135; American Journal of Science, XI (1926), pp. 501–504; Science, LXII (1925), pp. 397–398; Annals and Magazine of Natural History, XVIII (October, 1926), pp. 317–322. The name Sunchal Formation was proposed in Natural History, 1927. The fauna, including the species now described, includes the following named species. Many other small beetle elytra, and various fragments of insects, have been left unnamed, as their description would not add anything of much value. I had not intended to describe so many of the weevils, but one of my former students, Mr. Chas. Wagner, made a study of them and gave preliminary descriptions of fifteen which he considered new; these were photographed (greatly enlarged) through the kindness of my colleague, Mr. Chas. R. Bitter. It would be interesting to compare these elytra minutely with those of the very rich South American weevil faunas, but materials for such a purpose are not available. The location of the specimens is indicated by letters, as follows: (A.) American Museum of Natural History; (B.) British Museum; (Y.) Yale University; (U.) U. S. National Museum.

(1) FISHES

Callichthyidae: *Corydoras revelatus* Cockerell (B.)

Poeciliidae: *Cyprinodon* (?) *primulus* Cockerell (A.)

(2) COLEOPTERA (beetles)

Carabidae: *Carabites harringtoni* Cockerell (A.)
Carabites schueli Cockerell (B.) (Y.)
Lebia harrelli Cockerell (A.)

Elateridae: *Elaterites microstictus* Cockerell (B.) (Y.)
Elaterites bruchi Cockerell (B.)

Chrysomelidae: *Chrysomalites danielis* Cockerell (B.)

Cerambycidae: *Haruspex* (?) *defectus* Cockerell (B.)
Cerambycites wilmattae Cockerell (B.)
Anthicidae: *Anthicus sepultulus* Cockerell (B.)
Cryptophagidae: *Cryptophagus sunchalensis* Cockerell (B.)
Cleridae: *Trichodes* (?) *stebingeri* Cockerell (A.)
Cantharidae: *Podabrus* (?) *santaritensis* Cockerell (A.)
Tenebrionidae: *Tenebrionites inclinans* Cockerell (U.)
Curculionidae: *Cossonus* (?) *devoratus* Cockerell (U.)
Otiorhynchites aterrimus Cockerell (U.) (Y.)
Otiorhynchites crassus Cockerell and Wagner (A.)
Anthonomus (?) *sunchalensis* Cockerell (U.) (A.)
Curculionites harringtoni Cockerell (U.) (Y.)
Curculionites jujuyensis Cockerell (U.) (A.)
Curculionites wielandi Cockerell (U.)
Curculionites stebingeri Cockerell (B.)
Curculionites angustior Cockerell and Wagner (A.)
Curculionites sunchalicus Cockerell and Wagner (A.)
Curculionites latiusculus Cockerell and Wagner (A.)
Curculionites eustictus Cockerell and Wagner (A.)
Curculionites microstictus Cockerell and Wagner (A.)
Curculionites epistictus Cockerell and Wagner (A.)
Curculionites megastictus Cockerell and Wagner (A.)
Curculionites parastictus Cockerell and Wagner (A.)
Curculionites magdalinus Cockerell and Wagner (A.)

(3) ORTHOPTERA (crickets)
Gryllidae: *Gryllites vociferans* Cockerell (B.)
Gryllites vocalis Cockerell (A.)

(4) DERMAPTERA (earwigs)
Psalis pachyura Cockerell (B.)

(5) TRICHOPTERA (caddis-flies)
Molannidae: *Molanna* (?) *derosa* Cockerell (U.)

(6) HEMIPTERA-HETEROPTERA
Coreidae: *Corizus* (?) *deflagratus* Cockerell (B.)

(7) HEMIPTERA-HOMOPTERA
Flatidae: *Ormenis devinctus* Cockerell (B.)
Cixiidae: *Hypocixius oblitescens* Cockerell (B.)

There can be no doubt, I believe, that this is a Tertiary fauna, and it need not be early Tertiary. The matter is discussed in the articles above cited, but I now add some very interesting information and comments just furnished by Mr. Harrington (letters of April 19 and September 28, 1935).

You will doubtless be interested in knowing that the area within which the fossil beetles are found is far more extensive than I had imagined would be possible. I believe that the government (or Yacimientos Petroliferas Fiscales) geologist, Dr. Boehm, has found them as far north as the Lomas de Olmedo, nearly a degree of latitude to the north (and somewhat to the east) of Sunchal. During the past season

I found them at at least half a dozen places on the next two ranges east of the Sierra Santa Barbara, south almost to the Rio Juramento, or Rio Pasage. I believe that the Texas Co., geologists also found them on a tributary of the Rio or Arroyo Colorado (into which the Arroyo Sunchal waters eventually find their way), farther to the south than where we found them. There is now a fairly complete report on the areal geology by a Swedish geologist, Dr. Tor Hagerman. He takes exception to the age of the green shales which we have assumed, and I have wondered on reading over his report whether his interpretation is correct, or whether we were correct in assuming a Tertiary age. Could the beetles and fish you found be as old as upper Jurassic? In the underlying limestones I found a few specimens that may include two or three or possibly as many as five species of spiral turritelloid-like gastropods that may throw a little light on the subject, as there seems a more or less unbroken sequence upward from the limestone into the variegated shales. The limestone, however, is, in part, of shallow water origin, with ripple-marks and mud cracks, oölites, algal limestones, and conglomeratic limestones. (Written from Tartagal, April 19.)

(Regarding the turritelloid shells, see the discussion in Natural History, XXVII, p. 84.)

I worked over quite an extensive area during the past year, and obtained considerable data on the stratigraphic sequence, and found the beetle wings from the top of the heavy limestone, up through several hundred feet of the varied shales to the top of the green beds. I believe the Y. P. F. geologists found some even higher, in the overlying red shales.

I am very glad to have your statement that the fish is definitely Tertiary, as it confirms my own ideas, even though this means putting 10,000 or 20,000 feet of younger beds also in the Tertiary, which is by no means impossible, when we consider it as being the débris from eroded Andean uplift from which, over the crest of the folds, some 6000 feet or more has been removed. (Written from Palo Alto, Calif., September, 28.)

Mr. Eugene Stebinger writes (October 4, 1935) that beetle elytra were found by Mr. D. C. Harrell in the Province of Jujuy; "Location oo/cc 58 of upper Arroyo Santa Rita and oo/cd 27 of Quebrada 'El Griton'." This material has now been sent on. For the most part it is similar to that already recorded, but there are three very distinct new species of beetles, herewith described.

FISHES

Cyprinodon (?) **primulus,** new species

Figure 1, A. M. N. H. Cat. No. 24521

Very small broad-oval scales, about 1.5 mm. long, with six long basal radii, and none lateral or apical; circuli coarse; no trace of ctenoid structure, outline rounded, without angles; nucleus smooth, appreciably above the middle.

Ranges east of Sierra Santa Barbara, Prov. Jujuy, Argentina (Geo. Harrington). In addition to the type scales there are fragments of others on the same piece of rock. This is a poeciliid type of scale, and

is referred to *Cyprinodon* with doubt; I have not seen a *Cyprinodon* scale with so few radii. Probably it could be closely matched by the scales of some of the small South American Poeciliidae, material of which is not available. As preserved, the area which was exposed is brown, the concealed parts are pale.

There is also a fish-spine about 14 mm. long; it could just as well be one of the spines of the dorsal fin of *Percichthys antiquus* A. S. Woodward, 1898.

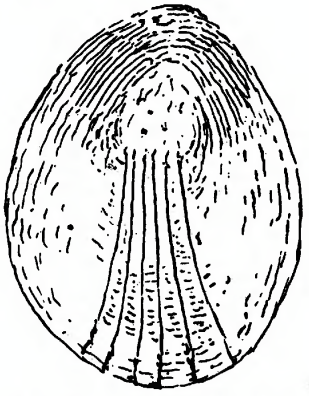

Fig. 1. *Cyprinodon* (?) *primulus*, new species.

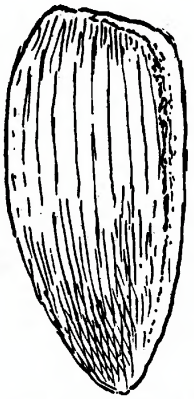

Fig. 2. *Carabites harringtoni*, new species.

BEETLES

Carabites harringtoni, new species

Figure 2, A. M. N. H. Cat. No. 24522

Elytron about 10.5 mm. long and 5 broad; as preserved, dark brown without markings; humeral margin broad and straight, somewhat oblique; depressed lateral margin broad, its width near base about 1 mm.; elytron between outer margin and sublateral groove with eight fine striae, the intervals very wide except the outermost and innermost; no punctures.

Ranges east of the Sierra Santa Barbara, Prov. Jujuy, Argentina (Geo. L. Harrington). Readily known from *Carabites schueli* Cockerell, from the same formation, by its much greater size, but sharing with that species the broad and relatively short form. There is a general resemblance to the modern genus *Amara*.

Lebia harrelli, new species (Carabidae)

Figure 3, A. M. N. H. Cat. No. 24518

Elytra about 4.5 mm. long, width of the insect in abdominal region 3.5; elytra with the humeral region narrowly black, a broad black band across middle of elytron

(its width fully 1.3 mm.), and the apex broadly black; there is also a band along each inner margin, but its upper end is feebly developed, though it probably was entire in life.

The locality is given as oo/cd 27—(D. C. Harrell).

The pattern would do also for *Panagaeus*, but the broad form agrees with some *Lebia*. There is a certain resemblance to some Chrysomelidae, as *Phytodecta*.

Trichodes (?) **stebingeri,** new species (Cleridae)

Figure 4, A. M. N. H. Cat. No. 24519

Elytron about 3.8 mm. long, similar to that of the living *T. ornatus* Say, but much smaller, the subapical light band lacking; the median band curved upward (basal) at its inner end, and on the costal side very broadly continuous with the subhumeral band, which, as in *T. ornatus*, encloses a dark spot; no light spots near inner margin.

Collected by D. C. Harrell; oo/cd 27.

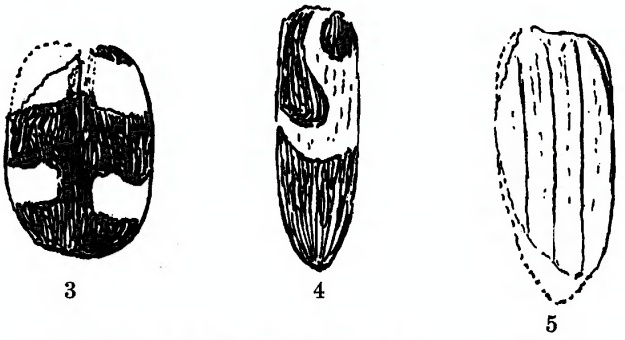

Fig. 3. *Lebia harrelli*, new species.

Fig. 4. *Trichodes* (?) *stebingeri*, new species.

Fig. 5. *Podabrus* (?) *santaritensis*, new species.

Podabrus (?) **santaritensis,** new species (Cantharidae)

Figure 5, A M. N. H. Cat. No. 24520

Elytron apparently about 4 mm. long, but apex not visible; very pale brownish, doubtless yellow in life; characterized by three parallel, widely spaced, strong raised lines, as in the modern *Podabrus*. It probably belongs to a different but related genus. There are two faint longitudinal rugulose lines between each pair of raised lines, but no trace of any cross ridges.

Collected by D. C. Harrell; oo/cd 27. About 3 mm. from the type of *Trichodes stebingeri*.

Anthonomus (?) sunchalensis Cockerell

Figure 16, A. M. N. H. Cat. No. 24516; Figure 18, A. M. N. H. Cat. No. 24517

Elytron about 5.4 mm. long and 2.4 wide; nine rows of punctures, with eleven punctures to the mm.

Sunchal (Cockerell). Specimen marked 18. Mr. Wagner had separated this as new, but it seems to me to belong to *A. sunchalensis.* I also place here the specimen marked 16.

Otiorhynchites crassus Cockerell and Wagner, new species

Figure 12, A. M. N. H. Cat. No. 24513

Elytron about 7 mm. long and 3.5 wide; nine rows of large punctures, three to one mm. Larger and more coarsely punctured than *O. aterrimus* Cockerell, from the same deposit.

Sunchal, Station 3 (Cockerell). Specimen marked 12.

Curculionites angustior Cockerell and Wagner, new species

Figure 11, A. M. N. H. Cat. No. 24512

Elytron about 3.1 mm. long, 1 mm. wide; five rows of punctures showing nine punctures to the mm.; the punctures are broad and set close together.

Sunchal, Station 2 (Cockerell). Specimen marked 11. It is proportionately narrower than in *C. jujuyensis* Cockerell, from the same deposit.

Curculionites sunchalicus Cockerell and Wagner, new species

Figure 14, A. M. N. H. Cat. No. 24515

Elytron about 3.7 mm. long, 1.9 wide; as preserved brown; nine rows of punctures, with ten punctures to the mm., the punctures very minute and set close together.

Sunchal, Station 3 (Cockerell). Specimen marked 14. Distinguished by its small size and broad form from other species in this deposit. It must have been a very robust beetle, such as *Tanysphyrus.*

Curculionites latiusculus Cockerell and Wagner, new species

Figure 8, A. M. N. H. Cat. No. 24507

Elytron about 3 mm. long, 1.5 wide; dark brown as preserved; ten rows of punctures, with eight punctures to the mm.

Sunchal, Station 2 (Cockerell). Specimen marked 8. More robust than *C. jujuyensis* from the same deposit.

Curculionites jujuyensis Cockerell

Figure 7, A. M. N. H. Cat. No. 24506

Elytron about 2.25 mm. long, .9 wide; nine rows of punctures, with ten punctures to the mm.

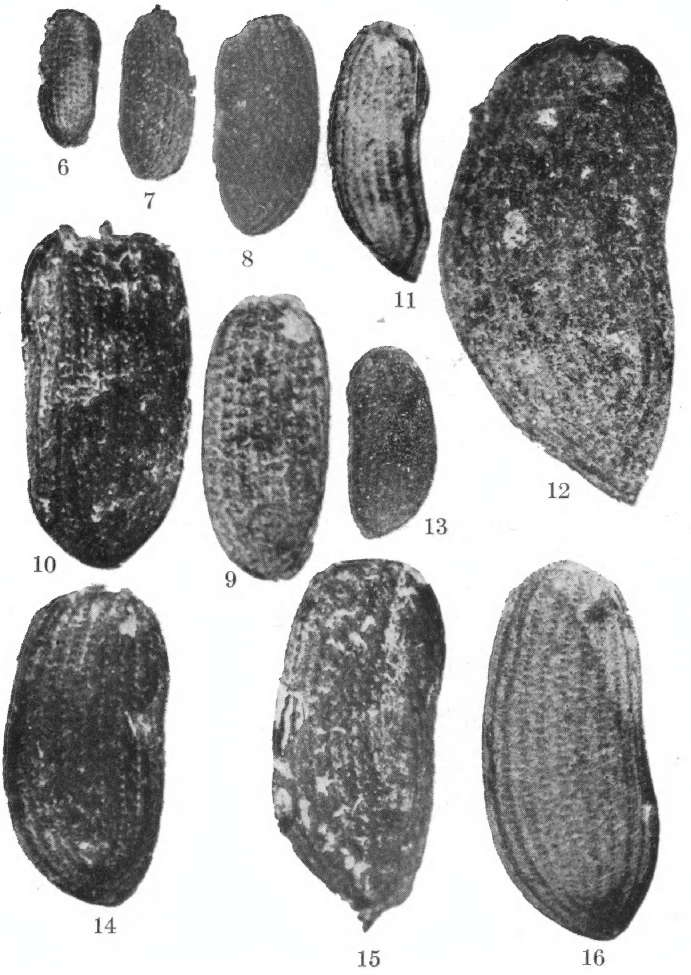

Fig. 6. *Curculionites parastictus* Cockerell and Wagner, new species.
Fig. 7. *Curculionites jujuyensis* Cockerell.
Fig. 8. *Curculionites latiusculus* Cockerell and Wagner, new species.
Fig. 9. *Curculionites eustictus* Cockerell and Wagner, new species.
Fig. 10. *Curculionites microstictus* Cockerell and Wagner, new species.
Fig. 11. *Cucrulionites angustior* Cockerell and Wagner, new species.
Fig. 12. *Otiorhynchites crassus* Cockerell and Wagner, new species.
Fig. 13. *Curculionites parastictus* Cockerell and Wagner, new species.
Fig. 14. *Curculionites sunchalicus*, Cockerell and Wagner, new species.
Fig. 15. *Curculionites epistictus* Cockerell and Wagner, new species.
Fig. 16. *Anthonomus* (?) *sunchalensis* Cockerell.

Sunchal (Cockerell). Specimen marked 7. Mr. Wagner had separated this out as new, but it is so like *C. jujuyensis* that I cannot satisfactorily separate it.

Curculionites eustictus Cockerell and Wagner, new species
Figure 9, A. M. N. H. Cat. No. 24508

Elytron about 3.5 mm. long, 1.5 wide; nine rows of punctures, with six punctures to the mm.

Sunchal, Station 2 (Cockerell). Specimen marked 9. The elytron is narrower than in *C. sunchalensis;* the beetle must have been considerably less robust. The punctures appear dark on a light ground.

Fig. 17. *Curculionites megastictus* Cockerell and Wagner, new species.
Fig. 18. *Anthonomus* (?) *sunchalensis* Cockerell.

Curculionites microstictus Cockerell and Wagner, new species
Figure 10, A. M. N. H. Cat. No. 24509

Elytron about 4 mm. long, width 2; nine rows of punctures with six punctures to the mm.; apex obtuse.

Sunchal, Station 2 (Cockerell). Specimen marked 10, 3.5 mm. from the type of *C. eustictus.* Very like *C. harringtoni* Cockerell, from the same deposit, but conspicuously smaller. It is dark brown as preserved, much darker than *C. eustictus.*

Curculionites epistictus Cockerell and Wagner, new species
Figure 15, A. M. N. H. Cat. No. 24510

Elytron about 4.5 mm. long, 2 wide; nine rows of punctures, with seven punctures to the mm.; apex conspicuously more attenuate than in *C. microstictus.*

Sunchal, Station 2 (Cockerell). Specimen marked 15, about 8 mm. from the type of *C. microstictus.*

Curculionites megastictus Cockerell and Wagner, new species

Figure 17, A. M. N. H. Cat. No. 24511

Elytron about 4.75 mm. long and 2.25 wide; nine rows of punctures, with five punctures to the mm. The punctures are much larger than on *C. microstictus*.

Sunchal, Station 2 (Cockerell). Specimen marked 17, 3 mm. from the type of *C. microstictus*.

Curculionites parastictus Cockerell and Wagner, new species

Figure 13, A. M. N. H. Cat. No. 24514

Elytron as preserved pale brown; 3.30 mm. long and 1.4 wide; nine rows of punctures, with eight punctures to the mm. Very like *C. sunchalensis*, but narrower.

Sunchal (Cockerell). Specimen marked 13.

Curculionites magdalinus Cockerell and Wagner, new species

Figure 6, A. M. N. H. Cat. No. 24505

Elytron about 1.5 mm. long, .7 wide; eight rows of extremely small punctures, thirteen punctures to the mm.; it is parallel-sided, with very obtuse apex.

Sunchal (Cockerell). Specimen marked 6. Much smaller than *C. jujuyensis*. It is suggestive of the modern genus *Magdalis*.

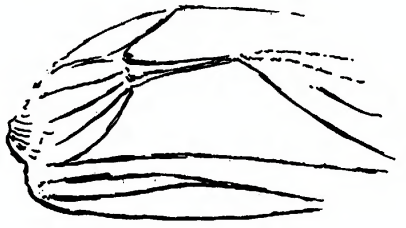

Fig. 19. *Gryllites vocalis*, new species.

CRICKET

Gryllites vocalis, new species

Figure 19, A. M. N. H. Cat. No. 24523

Male; the part of tegmen visible 7 mm. long and 4 broad, but the vertical portion with oblique veins is not preserved; as preserved, the wing is colorless. The venation is shown in the figure.

The name *Gryllites* is used to cover fossil Gryllidae which cannot be referred to particular genera. The present insect is not a *Gryllus*, but is more like *Gryllotalpa*, or even *Nemobius*.

Ranges east of Sierra Santa Barbara, Prov. Jujuy, Argentina (Geo. L. Harrington). Easily known from *Gryllus vociferans* Cockerell, from the same formation, by the greater size and differences in venation.